Space Weather Forecast

Issued on Friday, 04 August 2023 at 01:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate class flares (R1-R2; Minor-Moderate radio blackouts) throughout. Coronal Mass Ejection effects probable Days 1-3 (4th-6th Aug) with a chance of Minor Geomagnetic Storms.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity over the past 24 hours has remained at Moderate levels with one Moderate class flare observed, peaking at M2.0 at 03/1147 UTC. Nine numbered and one un-numbered sunspot region feature on the visible disc. The largest region is AR3380 on the southwest limb and remains unchanged. AR3386 in the northwest and AR3392 in the northeast are both the second largest regions and have also seen little significant change in recent hours, with minor reorganisation of the intermediate spots in both regions. New region AR3395, emerging across the northeast limb, is showing some signs of complexity and is marked as Dso/Beta and classification will probably change as it rotates further into view. Remaining regions appear generally stable or in decay. A full-halo Coronal Mass Ejection (CME) was observed leaving the Sun on the 2nd, this is likely to arrive at Earth late on the 5th or early on the 6th. Also, two eruptions late on 31 Jul (and observed on imagery early 01 Aug) are considered to have Earth-directed components arriving on the 4th or 5th.

Solar Wind / Geomagnetic Activity: The solar wind was at Low levels. The total interplanetary magnetic field strength was at weak levels to start becoming Moderate from 03/1430 UTC, with a peak of 10nT at 03/2055 UTC, with an upwards step change noted around 03/0930 UTC. The all-important north-south component was weak. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The observed count rate of energetic particles (high energy protons) was at background levels throughout.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is likely to be Low to Moderate, with the most likely in the immediate term from the complex region on the southwest limb. Two other moderately large regions in the northeast and northwest also contribute most of the risk of any further Moderate class flares.

Solar Wind / Geomagnetic Activity: A couple of side glancing CMEs may affect Earth on Day 1 (4th Aug), but perhaps into Day 2 (5th Aug). A more direct hitting CME is expected to impact Earth late day 2 or into day 3 (6th Aug). Solar winds at Low levels to start, perhaps becoming slightly elevated 400-500km/s into the period due to transient faster winds and potential CME influence. Low confidence in details. Geomagnetic activity is expected to be Quiet to start day 1 (3rd Aug), becoming Unsettled to Active with a chance of Minor Geomagnetic Storm intervals from late Day 1 through until Day 3, then probably returning to Quiet to Unsettled levels by Day 4 (7 Aug).

Energetic Particles / Solar Radiation: The count rate of energetic particles is likely to remain

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at background levels. There is a slight chance of further enhancements from any larger flares that occur, mainly from the complex region rotating across the southwest limb for the next two to three days.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	30	40	5
Strong	G3	No	1	5	10	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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